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ABSTRACT

Mastery learning represents an increasingly prolific area of research in educational psychology that encompasses two principal characteristics: (1) an optimistic set of assumptions regarding the capability of students to learn if alterable variables comprising the conditions of learning are optimized; and (2) an array of adaptive instructional procedures predicated on the medical model of diagnostic-prescriptive intervention. From both theoretical and practical perspectives, mastery learning has been a catalyst for paradigm shift from a dominant prediction-selection model to an emerging diagnostic-development model. Since Bloom's seminal publication in 1968, the preponderance of the mastery learning literature has focused on the North American experience and its sociocultural interpretations with only occasional documentation of mastery learning efforts in other parts of the world. In response to this imbalance, this paper attempts to review mastery learning efforts in the European research community over the past 25 years. Attention is given to developments in mastery learning theory and practice as documented in several European countries with a view toward acknowledging and expanding research in this area of educational psychology. (Contains 71 references.) (Author/SLD)

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# Mastery Learning in the European Research Community

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Abstract

Mastery learning represents an increasingly prolific area of research in educational psychology that encompasses two principal characteristics: (a) an optimistic set of assumptions regarding the capability of students to learn if alterable variables comprising the conditions of learning are optimized and (b) an array of adaptive instructional procedures predicated on the medical model of diagnostic-prescriptive intervention (Bloom, 1968, 1976). From both theoretical and practical perspectives on learning and instruction, then, mastery learning has served as a catalyst for a paradigm shift from a dominant prediction-selection model to an emerging diagnostic-development model (Dyck, Van de Looverbosch, & Wouters, 1982).

Since Bloom's seminal publication in 1968, the preponderance of the mastery learning literature has focused on the North American experience and its socio-cultural interpretations with only occasional documentation of mastery learning efforts in other parts of the world. In response to this imbalance in the mastery learning literature, this paper attempts to review those mastery learning efforts that have occurred in the European research community over the past 25 years. Accordingly, attention is given to developments in mastery learning theory and practice as documented in several European countries with a view toward acknowledging and expanding research in this area of educational psychology.

## Mastery Learning in the European Research Community

Mastery learning focuses on the relationship between the concepts of instructional/learning time as a variable and high student achievement as a constant. In the context of the 20th century, this conceptual and research emphasis can be traced initially to the efforts of Washburne (1922) and Morrison (1926) and, more recently, to the seminal work of Carroll (1963).

### Carroll's Model of School Learning

John B. Carroll's (1963) model of school learning is a theoretical paradigm that describes the degree of learning that occurs in a school setting as a function of the time spent by a student on a learning task divided by the time needed by the student for the mastery of that task. The model, then, is formulated as follows:

Degree of Learning = f (Time Spent/Time Needed)

Additionally, Carroll's model suggests that a student's time needed to learn a particular task is determined by such variables as the student's aptitude and ability to understand instruction as well as the quality of instruction to which the student is exposed. Regarding the numerator in the model, time spent, Carroll identifies such factors as student perseverance on the learning task and opportunity to learn as the principal determining variables.

### Mastery Learning's Two Dimensions

Benjamin S. Bloom's (1968, 1971, 1976, 1978, 1980) mastery learning represents an increasingly expanding research area in educational psychology that is predicated on Carroll's model and encompasses two major dimensions: (a) It entails an optimistic set of assumptions regarding the capability of students to learn what we have to teach them provided that certain alterable variables constituting the essential conditions of learning are optimized. (b) It specifies a set of adaptive instructional procedures reflective of the medical model of diagnostic-prescriptive intervention. Mastery learning, then, suggests that success or failure in school learning is largely an artifact of the extent to which we adequately accommodate certain learner-based and instruction-oriented variables considered to be alterable rather than static.

Optimistic Theoretical Assumptions

Regarding the optimistic theoretical assumptions of mastery learning, Bloom (1968, 1971, 1976, 1978, 1980) and his colleagues (most notably: Anderson & Block, 1985; Block, 1971, 1980, 1985) have argued that under favorable learning conditions the following expectations are indeed viable: (a) Most students--perhaps over 90%--can master what we have to teach them, thereby resulting in a desired negatively skewed distribution of achievement scores rather than the unfortunate though frequently cherished normal bell-shaped distribution of scores. (b) As many as 80% of our students can attain those high levels of achievement typically reached by only the top 20% of students. (c) Most students become very similar--rather than dissimilar--with respect to learning ability, rate of learning, and motivation for further learning as they progress more deeply into a given course and/or program of studies. (d) Profound advancements in student performance occur not only in the domain of cognitive learning but also in the affective realms of student attitudes, interests, self-concept, and mental health.

Adaptive Instructional Procedures

Concerning the adaptive instructional practices of mastery learning that reflect a type of diagnostic-prescriptive intervention, Anderson (1981) has focused on the following functions served by mastery learning components regardless of how they are named: (a) communicating positive expectations to students, teachers, administrators, and parents; (b) teaching new content/objectives within a larger subject-matter context and at appropriate levels of difficulty by way of relating the new learning to prior learning; (c) monitoring student learning via diagnostic-progress tests and making instructional decisions based on this ongoing evidence; (d) prescribing corrective work when needed to help students overcome errors and misunderstandings before they accumulate and interfere with subsequent learning tasks; and (e) basing student grades on their performance relative to pre-specified learnings that are sought rather than relative to the performance of other students.

Catalyst for Paradigm Shift

In both the theoretical and practical realms, then, mastery learning has served as a major catalyst for encouraging nothing less than a paradigm shift where the nature of learning and instruction is concerned. As suggested by Dyck (1976), Dyck and Wellens (1979), and Dyck and Wouters (1989), the dominant prediction-selection paradigm has emphasized such themes as a static conception of individual differences, revealing and analyzing individual differences, heterogeneity as outcome and

purpose of instruction, norm-referenced testing, selection of talent, and a nominal period of instruction and learning. By way of contrast, these same authors characterize the emerging diagnostic-development or outcome-based paradigm associated with mastery learning as highlighting such notions as pursuing equal outcomes, searching for alterable learner- and instruction-oriented variables, expecting success by virtually all students in the context of minimal variance, criterion-referenced testing, development of talent, and a focus on time-on-task.

## Mastery Learning Considered Internationally

Over the past 25 years since the appearance of Bloom's (1968) article titled "Learning for Mastery," most of the mastery learning literature has focused on the North American experience and its socio-psycho-cultural interpretations with only occasional documentation of mastery learning efforts in Western Europe, Asia, the Middle East, South America, and Australia (Anderson & Block, 1985; Hymel, 1990, 1991; Thomas, 1985). This pattern had been suggested earlier--and later corroborated--by entries in a comprehensive bibliography on mastery learning (Hymel, 1982), state-of-the-art literature reviews on mastery learning (Block & Burns, 1976; Guskey & Gates, 1986; Guskey & Pigott, 1988; Kulik, Kulik, & Bangert-Drowns, 1990; Kulik, Kulik, & Cohen, 1979), and attempts to identify major gaps in the literature that suggest future directions for mastery learning efforts (Hymel, 1990, 1991).

In response to this paucity of a worldwide perspective on mastery learning in the professional literature, a paper (Hymel & Dyck, 1992) delivered last year at the 25th International Congress of Psychology in Brussels attempted to initiate an international focus on mastery learning. Included among the several objectives of that paper was the acknowledgment of mastery learning efforts in approximately 30 nations beyond North America.

### Sources & Methods for a European Focus

The role of North American-rooted data bases such as ERIC and Psychological Abstracts is obviously foundational to locating mastery learning documentation. These are augmented on the international scene--particularly with respect to the European community--by (a) the British Education Index, (b) the Bulletin signaletique des Sciences de l'Education in France, and (c) EUDISED that spans 16 countries in Western Europe. These repositories do not, however, suffice as the sole sources of information on mastery learning programs and personnel. Another option that exists and has been used fruitfully is that of the so-called foreign affiliate membership rosters of national professional organizations (e.g., AERA and APA). Furthermore,

membership lists from international organizations (e.g., the International Council of Psychologists and the International Association of Applied Psychology) are useful in tandem with those of national organizations as a basis for periodic mailed surveys inviting input on mastery learning efforts that for whatever reason are not included in the standard data bases. Finally, as alluded to earlier the availability of various communication networks linking scholars who share similar research interests can ensure an ongoing dissemination of professional knowledge that otherwise may go untapped.

European Locations & Topical Areas

The following mastery learning citations are associated with authors, institutional affiliations, and/or research settings geographically positioned in Europe. Furthermore, each citation acknowledges the topical area(s) addressed by the mastery learning effort. Accordingly, they are as follows: Belgium (Dyck & Vanden Berghe, 1975--Evaluation; Dyck & Wellens, 1979--Theory & Practice, Teacher Education; Dyck & Wouters, 1989--Theory & Practice, Teacher Education; Dyck, Van de Looverbosch, & Wouters, 1982--Theory & Practice, Teacher Education); England (Arblaster, 1991--Reading; Backler, 1979--Geography; Collins, 1978--Biology; Gains, 1976--Remediation; Hermann, 1986--Theory & Practice; Leith, 1983--Theory & Practice; Mercer, 1986--Theory & Practice; Miller, Norton, & Servant, 1979--Chemistry; Pennycuik & Murphy, 1986--Psychometrics; Shale & Cowper, 1982--CAI; Spencer, 1990--Secondary Education, CAI; Straker, 1988--Mathematics & Science; Sumner, 1975--Theory & Practice); Finland (Lahdes, 1983--Theory & Practice); France (Council of Europe, 1975--Compensatory Education); Germany (Langeheine, 1992--Psychometrics; Sandrin, 1990--Theory & Practice); Ireland (Whiting, 1982, 1984--Psychometrics); The Netherlands (Boonstra, nd--Theory & Practice; Creemers, 1976--Theory & Practice, Management; de Gruijtes, 1985--Psychometrics; Reezigt & Weide, 1990--Language & Mathematics; Slavenburg & Peters, 1989--Theory & Practice; Van der Linden, 1987--Psychometrics; Vos, 1988--Psychometrics; Warries, 1974, 1979--Psychometrics, Theory & Practice; Weeda, 1982--Theory & Practice); Norway (Skaalvik, 1975--Evaluative Study); Scotland (Drever, 1987--Secondary Education; Johnstone, Mitchell, & Parkinson, 1980--Foreign Languages; Parkinson, Mitchell, & Johnstone, 1983--Foreign Languages; Peacock, 1981--Language Arts); Sweden (Dahllof, 1978--Evaluative Study; Fischbein, 1979--Developmental Psychology); and Switzerland (Flammer, 1973--Theory & Practice).

## Potential European Contacts on Mastery Learning

Sexton and Hogan's (1992) recent edited work titled International psychology: Views from around the world appears to be a landmark source that offers the possibility of identifying resource personnel throughout the world who might serve as entrees to mastery learning research not yet recognized via data bases mentioned earlier. In this regard, several entries in the book are authored by psychologists whose discussions of educational psychology, school psychology, developmental psychology, psychometrics, and/or teacher education in various European countries could very well lead to an expanded network of researchers and practitioners whose work perhaps relates to the issues inherent in mastery learning. These authors and their national affiliations (not reflecting some of the more recent geopolitical changes in national boundaries and names) are as follows: G. Guttmann and S. C. Etlinger--Austria; G. d'Ydewalle--Belgium; D. Kovac--Czechoslovakia; P. Niemi--Finland; A. A. Sanches--France; A. Kossakowski--German Democratic Republic; J. Groebel--Germany; L. Houssiadas--Greece; J. Laszlo and C. Plek--Hungary; T. Brady and J. McLoone--Ireland; A. L. Comunian--Italy; H. M. van der Ploeg--The Netherlands; H. Klove--Norway; Z. Chlewinski--Poland; M. Grigoroiu-Serbanescu--Romania; H. Carpintero--Spain; R. Burckhardt and R. Droz--Switzerland; G. Y. H. Vassaf--Turkey; L. F. Lowenstein--United Kingdom; and V. Pecjak--Yugoslavia.

## Recommendations for Advancing Mastery Learning Efforts in Europe

A prospective view of mastery learning in the European research community might very well incorporate the following two initiatives: (a) enhancing the use of communication networks and (b) expanding geographic locations and topical areas of impact.

### Enhancing the Use of Communication Networks

Currently available communication networks that represent potential sources of information on mastery learning specific to the European research community need to be coordinated and utilized more fully. Particular networks referred to here include--but are not limited to--the British Education Index, the Bulletin signaletique des Sciences de l'Education in France, EUDISED, the European Association for Research on Learning & Instruction (EARLI), and national professional organizations specific to the various European nations. Other options that exist and need to be explored more extensively are the foreign affiliate membership rosters of major professional organizations wherein mastery learning has had a consistent forum (e.g., AERA

and APA) as well as the membership of international organizations such as the International Council of Psychologists (ICP) and the International Association of Applied Psychology (IAAP). Also of importance is the current effort to establish an International Society for Mastery Learning (see Hymel & Dyck, 1992, 1993) that would sponsor forums both in printed form (e.g., quarterly newsletter and/or journal) and as biennial conferences (e.g., in affiliation with existing organizations such as AERA, APA, EARLI, ICP, and/or IAAP). This proposed professional society would likewise function as an international data base or repository for identifying, housing, consolidating, and monitoring mastery learning efforts worldwide.

Expanding Locations & Topics of Focus

As a consequence of the communication networks discussed above, another prospective feature of mastery learning in the European community is that of initiatives focused on expanding those geographic locations and topical areas impacted by mastery learning efforts. A major impetus for this prognosis is found in the reality of professional organizations becoming more internationally sensitive (see Perkins, 1985) and, consequently, the heightened attention given to cross-cultural issues (see: Berry, Poortinga, Segall, & Dasen, 1992; Brislin, 1990) considered from a multidisciplinary standpoint. This anticipated "migration" to nations and topical areas not previously included in the mastery learning movement would presumably avoid unnecessary overlap while accommodating those locations and topics that have been omitted in the past for whatever reasons.

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